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Sterrenberg & Keating  
*Measuring IS success of e-government*

# Measuring IS success of e-government: A Case Study on the Disability Sector in Australia

**Gary Sterrenberg**

Research School of Management  
Australian National University  
Canberra, Australia  
Email: [gary.sterrenberg@humanservices.gov.au](mailto:gary.sterrenberg@humanservices.gov.au)

**Byron Keating**

Research School of Management  
Australian National University  
Canberra, Australia  
Email: [byron.keating@anu.edu.au](mailto:byron.keating@anu.edu.au)

## Abstract

Despite unprecedented investments in e-government annually, the degree to which these initiatives are successful in delivering government outcomes varies widely. It is posited that traditional means of evaluating these systems overlook important measures needed to support the ultimate success of e-government. To address this gap, this study will: (1) identify the critical features of e-government that influence success; (2) investigate how public value is created through the use of e-government; and (3) propose and test a public value based success model to explain the creation of value within the disability sector. This study extends the DeLone and McLean IS Success Model (2003) using a theoretically based framework grounded from Public Value Theory to provide a perspective for evaluating e-government success. The contribution of the model is to assist governments in making complex information system portfolio investment decisions.

**Keywords** e-government, public value, social quality, IS success

## 1 Introduction

Past studies evaluating e-government success have been somewhat limited, despite the fact that e-government systems have had an important impact on the way public services have been delivered in recent years. Most published e-government research has either been case studies or theoretical frameworks, focussed on analysing a particular e-government implementation (Srivastava and Teo 2010). An important challenge facing e-government is that once implemented, the use of the system does not always last and so investments are often wasted (Zhang et al. 2010). This finding is supported by international research that has highlighted that approximately 70 to 80 per cent of e-government implementations have failed to deliver the intended outcome (Heeks and Stanforth 2007). This makes the measurement of e-government systems success essential if they are to be used as a vehicle to deliver government outcomes.

The prevailing approaches currently used by governments in measuring success of e-government initiatives have a propensity to replicate those of commercial firms, concentrating on delivery against functional outcomes and benefit measures like return on investments and cost reduction (Irani and Love 2008). However, e-government systems diverge from approaches used in the private sector in that they “frequently encompass strategic goals that go beyond efficiency, effectiveness and economy, and include political and social objectives such as trust in government, social inclusion”, and sustainability (Grimsley and Meehan 2007). Furthermore, the use of e-government systems is increasing rapidly as more and more capabilities are deployed online, including facilitated access by citizens to non-government service providers. This requires a comprehensive and adaptive measurement approach to determine the success of e-government initiatives in delivering public policy outcomes. In the context of this study, e-government is defined as:

*“a cohesive collection of infrastructure, information, services and capabilities, on which communities can interact, engage, develop and exploit their own opportunities, markets and progress” (Loffler 2009).*

Increasingly, citizens are using e-government and hence it is essential to measure success of e-government services from a citizen perspective (Wang and Liao 2008). The motivation for this study is a response to a growing call in the e-government field for approaches that go beyond efficiency and technological determinism, to adopting an appreciation of the social outcomes that underlie the success of e-government services. This study will utilise the DeLone and McLean (2003) IS Success model to develop a set of measures from the perspective of the citizen, and to assess what features of the system affect success in e-government systems.

In particular, this research offers some unique contributions: (1) the research is the first study of e-government success measures for the disability sector; (2) the research will use a machine-monitoring approach to collect actual data to remove instrument bias from the study results; and (3) the research will recalibrate the focus to social quality as a separate dependent variable in determining the success of e-government in determining public policy outcomes.

## 2 IS success and e-government

DeLone and McLean (1992) expansively studied measures responsible for system success and published a model showing the interrelationships between six key variables: system quality, information quality, use, user satisfaction, individual impact, and organisation impact. This model made several significant contributions to the knowledge of IS success. It provided a structure for classifying the myriad of system success measures and proposed a model of causals and temporal interdependencies between the various categories (McGill, Hobbs and Klobas 2003; Seddon 1997).

Many empirical studies have explored and extended the original IS success model. Seddon and Kiew (1994) adapted the model by replacing ‘use’ with ‘perceived usefulness’ which they considered served as a more universal measure of IS net benefits. Rai, Lang and Welker (2002) empirically examined the DeLone/McLean and Seddon models in a situational context where system use was quasi voluntary, and concluded that both the models provided an appropriate gauge of IS success.

In 2003, following a decade of critique and significant changes in the growth and usage of the internet, DeLone and McLean proposed to modernise their model. They agreed with the premise that amalgamating process and variance explanations in one model created unnecessary complexity, but contended that Seddon's proposal to split the model into a two part variance representation unduly complicated the model and undermined the original intent. They also added a service quality measure as an additional independent variable. Notwithstanding the claim of several researchers that the service

quality dimension is simply a subset of systems quality, DeLone and McLean (2003) argued that recent advances in information systems supported the inclusion of a service quality as a separate variable dimension due to its pivotal role. To avoid further complication of the model, DeLone and McLean also grouped all of the impact measures together into a sole net benefits variable. In further adjustments to the original model, they posited that the 'use' and 'intention to use' dimensions can be applied alternately dependant on the mandatory or voluntary contextual nature of the usage. This updated figure is shown below (Figure 1).

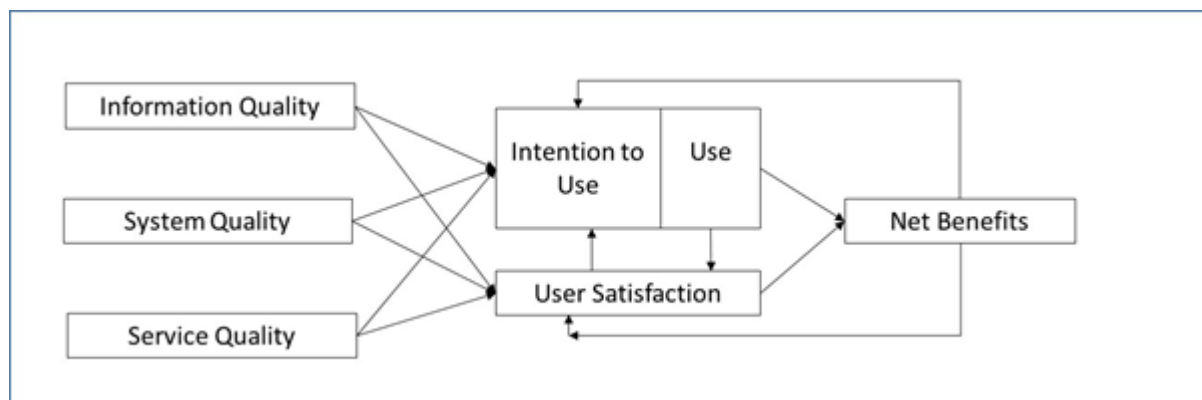


Figure 1: Updated Delone and Mclean IS Success Model (2003)

Wang and Liao (2008) present one of the few studies of the IS success model within the context of government. Their study proposed that e-government system use is for the most part voluntary and system use is an actual behaviour, and therefore the 'use' dimension is a more appropriate measure of success in this context. The results of this study confirmed that all six variables in the DeLone and McLean model were supported, with perceived net benefits IS net benefit being considered a closer measure for e-government success than the other five measures.

Scott, Golden and DeLone (2016) proposed a unique and important adaptation of their 2003 model for the government context. By merging concepts from public administration and e-government research, they constructed a comprehensive model of public value net benefits measures from a citizen's perspective. They proposed that the use of public value to measure effectiveness, efficiency, and improved social value based on the DeLone and McLean (2003) model created a balanced success model, tailored for the public sector. The study measured the success of e-government by combining a comprehensive set of public value net benefits measures grounded on Public Value theory (see Figure 2).

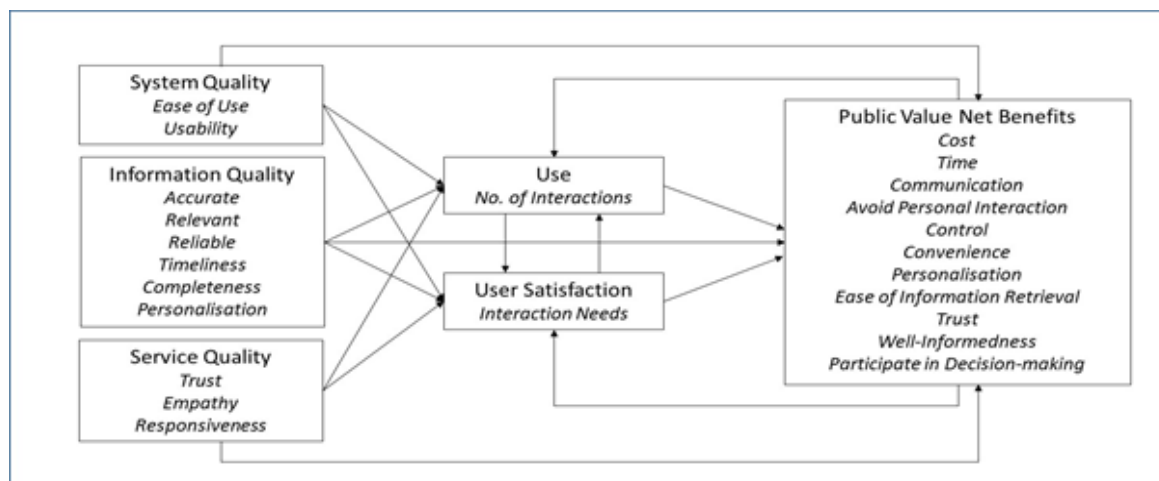


Figure 2: Scott, Golden and DeLone e-Government Success Model (2016)

The results of the study demonstrated that measuring success in e-government requires a multi-dimensional construct in order to accurately reflect net benefit value perceptions. Furthermore, it showed that success should be understood not just in terms of service based efficiencies but should also reflect the personal and societal impact of technology. Findings from the main survey sample showed that citizens perceive more value in benefits such as trust, communication, participation and personalisation, than in information and system quality variables like convenience and time saving benefits.

## **A revised model of IS success in the public sector**

Building on the prior IS success work, and in particular, the recent study by Scott et al. (2016), we propose a revision to this model in which social quality is modelled as an important, separate and antecedent variable to public value. In the Scott et al. (2016) study discussed above, the results show that a citizen's view of intangible social benefits such as trust and responsiveness, are at least as important as tangible gains such as improvements in systems and information efficiency and effectiveness. This implies that a change in view of the importance of social outcomes is needed in relation to the measurement of success in e-government. The consequence is that a more sophisticated understanding is needed regarding the role that technology plays in bringing about social outcomes within the public sector and in determining the success of e-government initiatives.

While the Scott et al. (2016) study incorporated social benefits within the measurement of public value, we suggest that the quality of the social benefits provided is actually antecedent to public value. Public Value, as defined by Moore (1995), "requires a balance of effectiveness and efficiency measures with improvements in social and democratic values such as participation, engagement, and trust in government". As Hill and Sullivan (2006) observe, public value is driven by a set of core social and economic values that are needed for the assessment of outcomes and the processes by which the outcomes are to be delivered.

It is thus necessary to extract social related benefits from the definition of public value. To inform our conceptualisation of the quality of the social benefits obtained (social quality), we draw on the work of Phillips (2006) who identifies four domains for the measurement of social benefits: (1) socio-economic security ensuring people have the resources to cope with daily life (i.e., convenience, control, and personal interaction); (2) social cohesion (i.e., the glue that binds individuals together and creates trust, responsiveness and openness); (3) social inclusion (i.e., the degree to which people feel integrated in institutions, organisations and social systems); and (4) social empowerment (i.e., ability to make use of the opportunities available to them).

Social quality measures are important in a government context and emphasise a complex field of conditional, constitutional and normative factors. These include, social cohesion, socio-economic security, social inclusion, person/human security, social empowerment, social recognition, personal/human capacity, social responsiveness, and social justice (equity), equal valuation, solidarity, and human dignity. Figure 3 contains the representation for the proposed research model showing the hypothesised relationships.

The hypothesised relationship between citizen (user) satisfaction, use, net benefits and the quality constructs is based on the work of DeLone and McLean (2003) plus the addition of the new variable of social quality. The expectation of causal interrelations between these constructs is further based on the empirical research conducted by Petter, DeLone and McLean (2008). Positive user experience will logically lead to greater user satisfaction and increased use in the model and will consequently lead to the creation of public value net benefit. Public value is a function of both the cost of resources expended to produce the service and the value received from the service.

The resultant public value emulates the notion of IS net benefits (DeLone and McLean 2003) and is concentrated around three broad public value creation objectives: effectiveness of the public service, efficiency of the public service, and improved social democracy (Jorgensen and Bozeman, 2007; Heeks, 2008; Bryson et al. 2014).

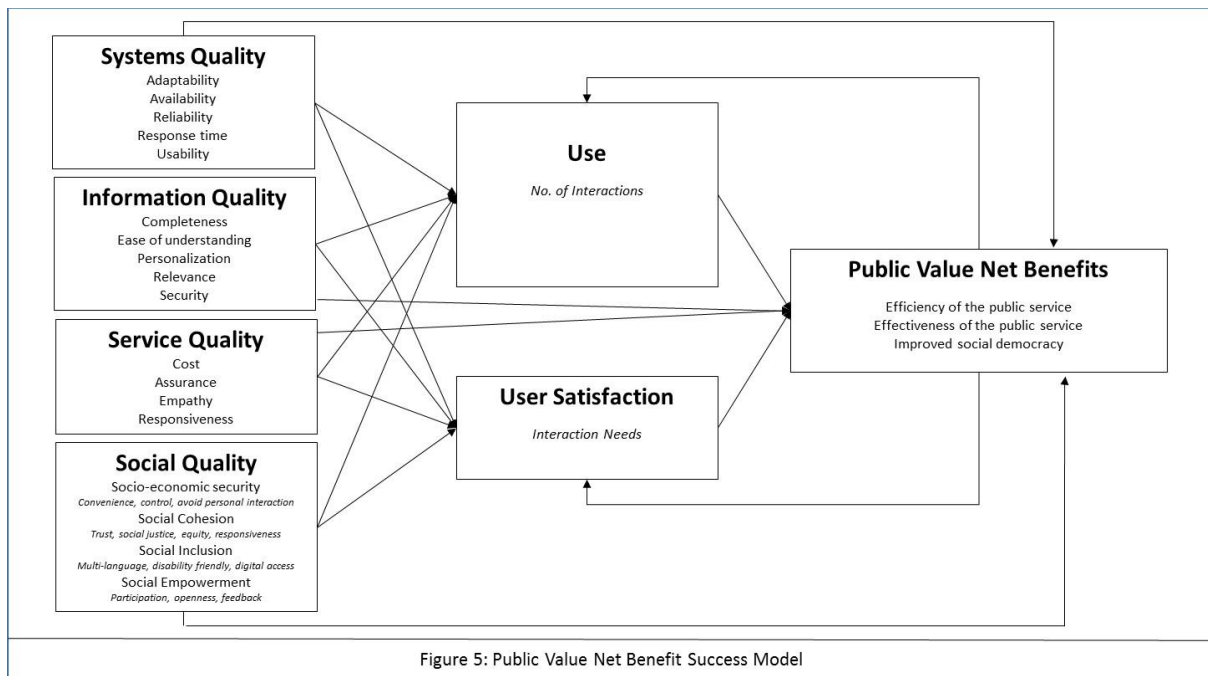


Figure 3: Public Value Net Benefit Success Model

### 3 Research design, approach and method

To provide a context for the study of IS success in a government setting, our study will be conducted in Australia using the success of a system developed to support the National Disability Insurance Scheme (NDIS). The NDIS is a national government funded scheme aimed at supporting citizens under the age of 65 years old who live with a permanent disability. This system is a community online service that enables citizens to purchase goods and services from the non-government sector to assist with achieving life goals, for which government pays. The delivery of the scheme is enabled by an open community based e-government system, providing a unique opportunity to evaluate the success of e-government.

The study will apply a sequential, explanatory mixed methods design (Creswell and Plano-Clark 2011). The initial qualitative work will centre on key informant interviews with reference group participants employed by the Australian Department of Humans Services to provide feedback to government on the system design. These informed users are nominated representatives who can respond on behalf of different disabled groups. The subsequent quantitative study will include a time series analysis of 25,000 participants over a three year study period. This constitutes all stage 1 participants currently registered with the NDIS. Each participant will be a registered user of the e-government system.

The mixed methodological approach is considered the most suitable given the nature of the research questions, and the unique research context. Collectively, the research design constitutes a single organisational case study. This particular approach is deemed particularly suitable where the aspiration is to realise “the goal of richness and analytical insight into people, events, and passion as played out in real life environments” (Yin 2005, p.15).

A significant contribution of this research relates to the way in which success will be measured. To obtain an objective measure for public value net benefit, and to avoid issues associated with common instrument and method bias, this research proposes to utilise machine-monitoring technology to capture actual performance data related to effective system usage and citizen satisfaction. The data will be collected using a real time cognitive intelligence big data platform run by the Department of Human Services on behalf of the NDIS. This platform will essentially capture all activities across the e-government system allowing the merging of broad-based data sets to aid the research. It will also be measuring all activity of the stakeholder groups, including citizens, suppliers of services and products, plan managers and local area co-ordinators.

This will provide unique bi-directional insights into how these value creating interactions develop over time. The data captured as part of this process will be used, along with the structural equation modelling,

to test the moderating stimulus of citizen satisfaction and effective system usage with sustainable public value net benefit creation. The results of this work will be presented to industry, participants and Government in a staged annual manner with the final analysis presented at the end of the study.

## 4 Conclusion

This research proposes a unique extension to the IS Success research stream. By integrating and extending the recent literature on public value and IS success, this research provides a citizen centric multi-dimensional explanatory framework for determining the success of e-government. Understanding the impact of various aspects of quality on success can act as a vital framework for public sector managers in evaluation of e-government initiatives and the development of future digital services.

There are two main contributions of this research. This study will identify a set of success criteria to be used in the measurement of e-government and, in particular, extend our understanding of e-government success by examining the impact of social quality on success measures including use, user satisfaction and public value net benefits. The impact of social quality constructs on citizen satisfaction, effective usage, and net benefits remains largely unclear. Various studies postulate significant relationships between other quality constructs and success measures, however the multi-dimensional and interdependent nature of e-government success remains largely untested. This study aims to expose the dynamics involved in e-government success from the viewpoint of the citizen.

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